

High Temperature Smart Structures for Engine Noise Reduction and Performance Enhancement, Phase I

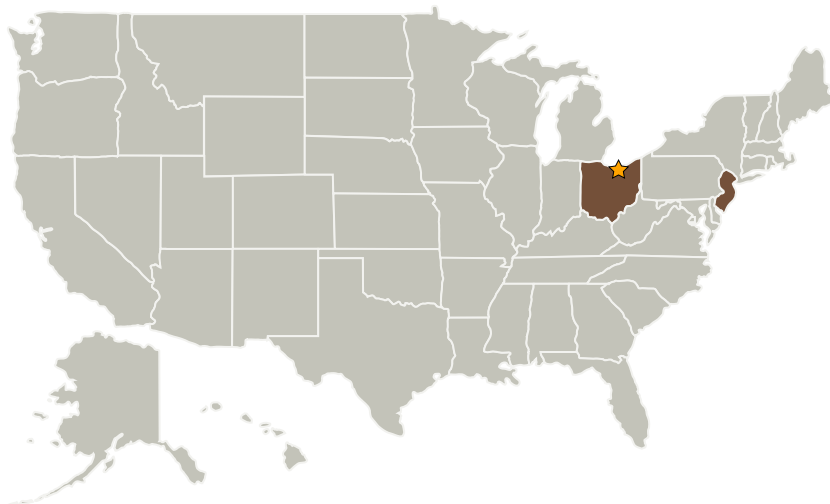
Completed Technology Project (2005 - 2005)



Project Introduction

Noise mitigation for subsonic transports is a continuing high priority, and recent work has identified successful exhaust mixing enhancement devices that have demonstrated substantial capability for reducing aircraft engine noise in critical takeoff and landing conditions. Existing fixed-geometry versions of such devices, however, are inherently limited to optimal noise mitigation in a single operating condition and also can impose significant performance penalties in cruise flight. An adaptive geometry device using smart structures technology offers the possibility of maximizing engine performance while retaining and possibly enhancing the favorable noise characteristics of current designs. The proposed Phase I effort will demonstrate the feasibility of this concept, focusing on design and demonstration of variable geometry chevrons using rapidly maturing Shape Memory Alloy (SMA) actuation technology. This work represents an extension of prior successful development of solid state smart structures, though it will exploit new high temperature SMA (HTSMA) materials technology to enable the devices to operate in both low temperature (fan) and high temperature (core) exhaust flows. While important in its own right, this development also holds the promise of being the first step in development of a range of smart materials devices for a spectrum of aeropropulsion applications.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Continuum Dynamics, Inc.	Supporting Organization	Industry	Ewing, New Jersey

Primary U.S. Work Locations

New Jersey	Ohio
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Todd Quackenbush

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.1 Integrated Systems and Ancillary Technologies